

Squatters Problems along Bagmati Riverside in Nepal and its Impact on Environment and Economy

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Abstract

The History of squatter settlements on the bank of Bagmati River shows that these were established more than 50 years ago but they were few in comparison to the present. Growth rate is 37.94 percent in 2008, 39.16 percent in 2009, 24.79 percent in 2010 and 15.83 percent in 2011. This indicates rapid growth in the years 2008 and 2009 and slower growth in 2010 and slow in 2011. Settlements are relatively small; some comprise fewer than 20 households are located on public land on the bank of rivers, these are heterogeneous not only in terms of the ethnicity or caste of their residents but also in terms of their places of origin, present occupation and income, family structure and reason of squatting. Riverbank seems to be the area that highly attracts the squatter communities. People residing in squatter settlements face many problems like improper sanitation, unhygienic environmental conditions, social, economic, health, educational and cultural problems and many more. The basic problems inherent in slums are health hazards, lack of basic amenities like safe drinking water, proper housing, drainage and excreta disposal services, make slum population vulnerable to infections. These further compromise the nutrition requirements of those living in slums. The squatter environment is the perfect breeding ground for a wide range of social and environmental problems. High unemployment often causes men to stay around the home growing increasingly frustrated with their pathetic situations and the worsening poverty. Cramped conditions mean that there is nowhere to go when tensions rise, a factor that regularly leads to domestic violence. Sometimes the situation goes to the other extreme, where people abandon their homes, lured by the prospect of stupor through alcohol or drug abuse.

Keywords: Squatter, Settlements, Vulnerable, Poverty, Tributaries.

1. Introduction

Urban environment in most Nepalese cities is degrading day by day over last couple of decades due to rapid and uncontrolled urban growth. Kathmandu city is the largest urban center in the country with five major cities, are suffering most due to this uncontrolled urban growth. Several government organizations and local bodies responsible to manage the areas in the valley and hundreds of government committees and non-government organizations working in these sectors have so far failed to make any significant improvement in the situation. Increasing trend in the number of the squatter settlement is one of the key issues related to uncontrolled urban growth in Kathmandu valley. In 1985 it was estimated that there were only 17 squatter communities in Kathmandu, but now the number has grown to 40. Besides, there are other settlements in different parts of the valley. An increasing trend of these settlements has significant impacts in local environment of the valley, any plans and programs designed to improve the valley's urban environment must effectively address the issue of squatter population.

In 1996, Government of Nepal formed the High Powered Bagmati Civilization Integrated Development Committee¹ (HPBCIDC) with the aim of improving the environmental situation of Bagmati River and its tributaries. The committee has initiated new strategies and programs for improving the environment along the Bagmati and its tributaries. Effective management of the squatter settlements along the rivers is one of the high priority activities of the committee.

Accurate and updated information about the squatter settlements along the Bagmati and its tributaries is essential for developing and implementing plans and programs for their efficient management. Although a few studies in past have identified the squatter settlements in the valley and provided their basic data, there is a need to regularly update this information as squatter tend to the temporary and mobile and their status tend to vary significantly over time and space in rapidly urbanizing cities. Recent political developments in Nepal which have increased the rate of internal migration within the country, has had significant impacts in the status of the squatter settlements as well. This study is designed to update the information provided by the earlier studies and to provide data base for the planners and decision makers to address the issues related to squatter problems in Kathmandu valley. The survey of secondary data was carried out in September 2012.

1.2 History and Importance of Bagmati River

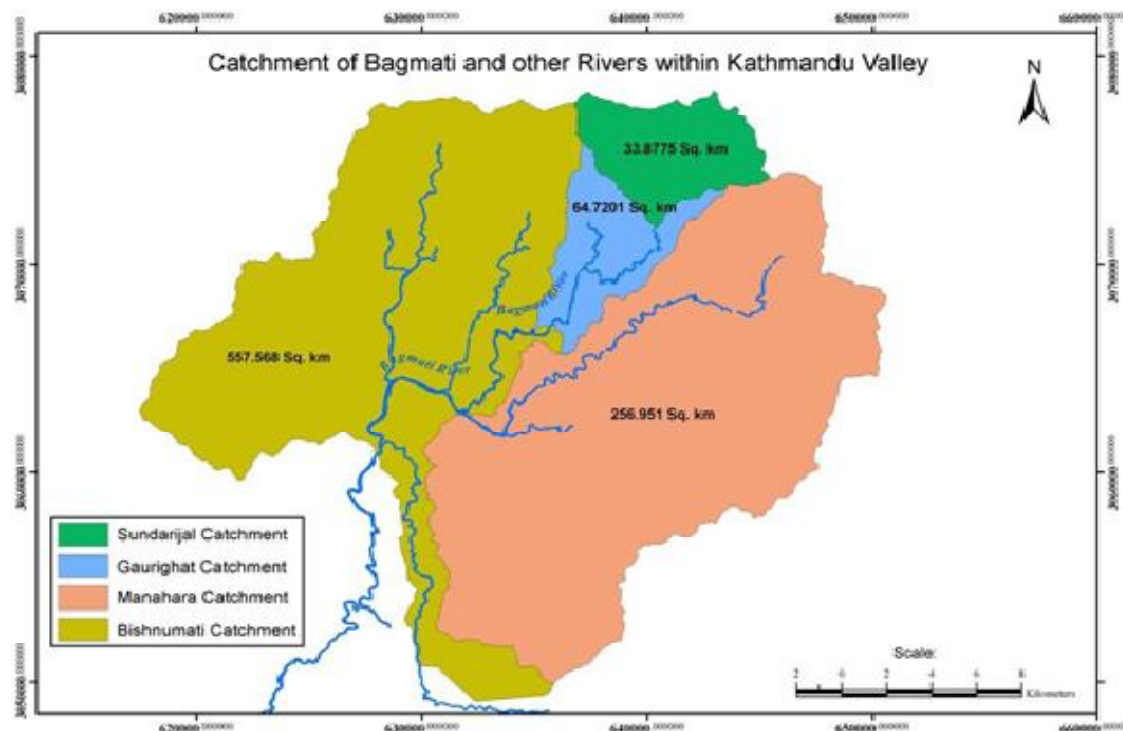
Bagmati is a river of Nepal. It flows through the Kathmandu Valley and is the river separating Kathmandu from Lalitpur. The river originates at Bagdwaar on the northern hills of Kathmandu valley and flows through several important parts of Kathmandu including the temple of Lord Pashupatinath, the holiest Hindu temple in Nepal. The river mixes with Bishnumati at Teku Dovan. The river crosses Chobar gorge², on the south of the valley, to flow out of the Kathmandu valley to finally reach Terai.

¹This committee formed and started to work in initial days but because of the political situation of Nepal, this committee couldn't implement any concrete program.

²Chovar is only an outlet point of several rivers of Kathmandu Valley.

The Chovar temple complex is at the entrance to this gorge. Bagmati is an important religious symbol to the Hindus of Nepal. It is considered as a holy river both by Hindus and Buddhists. A number of Hindu temples are located on the banks of this river. The importance of Bagmati also lies in the fact that Hindus are cremated on the banks of this holy river, and Kirants are buried in the hills by its side. According to the Nepalese Hindu tradition, the dead body must be dipped three times into the Bagmati River before cremation. The chief mourner (usually the first son) who lights the funeral pyre must take a holy river-water bath immediately after cremation. Many relatives who join the funeral procession also take bath in the Bagmati River or sprinkle the holy water on their bodies at the end of cremation. Bagmati River is thus considered purifying the people spiritually and physically.

Figure1: Catchment of Bagmati and other Rivers in Kathmandu Valley.



Source: www.nrtc.org.np/Bagmati/river/map-accessed in September, 2012.

2. Study Procedure

The squatter communities studied were identified by the field visit, direct interview, study reports and publications of government and non-government organizations especially which are involved in the field of squatters. Some data were taken from government and non-government offices and their websites. The squatter communities out of Bagmati riversides are mentioned just for reference rather than detail study and analysis on these.

3. Squatter Settlements in Kathmandu Valley

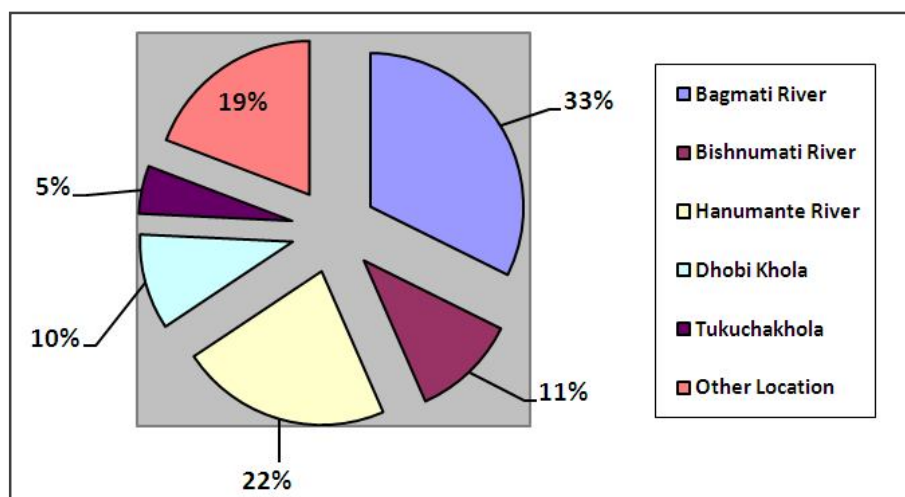
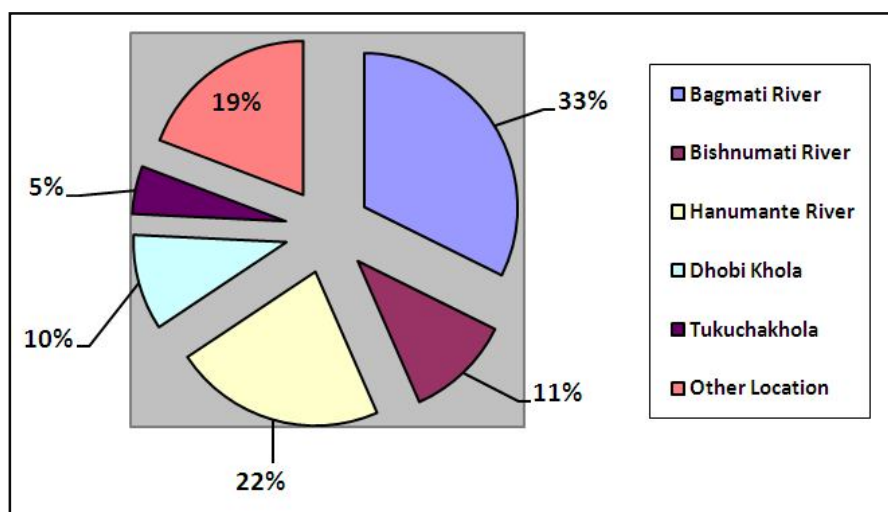
Nepal is a landlocked country with 26.6 million populations living over an area of 147,181 square kilometers. Its per capita income is just US\$742. Kathmandu has recorded the highest decadal population growth 60.93% from 2001 to 2010. As per the census results, out of total population, 17 percent (4.5 millions) reside in urban areas (CBS, 2011 Preliminary Report).

Table 1: Name of River and Nearby Squatter Settlements.

Nearby River	Name of Squatter Settlements
Bagmati River	Shanti Nagar, Bijay Nagar, Jagrit Nagar, Gairigaun, Chandani Tole, Pragati Tole, Kalimati Dole, Kimal Phant, Bansighat, Kuriyagaun and Sankhamul
Hanumante River	Manohara Bhaktapur
Bishnumati River	Dhikure Chouki, Kumaristhan Buddhajyoti Marga, Balaju Jagriti Tole, Sangam Tole, and Ranibari
Dhobi Khola	Santi Binayak, Devi Nagar, Bishal Nagar, Kupondole and Pathivara
Tukucha Khola	Narayantole, Maharajgung and Khadipakha Maharajgung
Other Locations	Palpakot, Anamnagar, Maijubahal, Kumarigal, Radhakrishna Chowk, Mulpani, Kapan Dhungen, Subigaun, Ramhiti, Mahankal, Dhumbarahi Sukedhara, Mandhikhatar, Galfutar, Ramghat, Dhaukhel and Bhimmukteshwar

Source: www.google.com/kathmandu/squatter-settlements: accessed in September, 2012.

Above table shows that total 11 settlements are residing on the bank of Bagmati River, 1 settlement on Hanumante River, 5 settlements on Bishnumati River, 5 settlements on Dhobikhola, 2 settlements on Tukucha and 16 settlements on the other locations in Kathmandu Valley. The squatter communities on the bank of Bagmati River are taken problematic rather than other settlements, it is because of the central location, heavy settlement area, and out of the sanitation and drinking water facilities. Keeping this in mind, The Government of Nepal destroyed squatter settlements established on the bank of Bagmati River in May 2012 to shift them on other locations but because of an organized protest against government they resettled there after one month.

Figure 2: Distribution of Squatter Population by Location**Figure 3: Distributions of Households by Location**

Source: Lumanti Bulletin, 2069 B.S.

The 40 squatter settlements of Kathmandu valley are providing shelter for about 12726 people (6612 male and 6114 female) in 2735 households. The average household size of these squatter settlements is 4.7. The population of squatters in different settlements, number of households and average household size are shown in table 2.

Table 2: Populations and Number of Households by Locations.

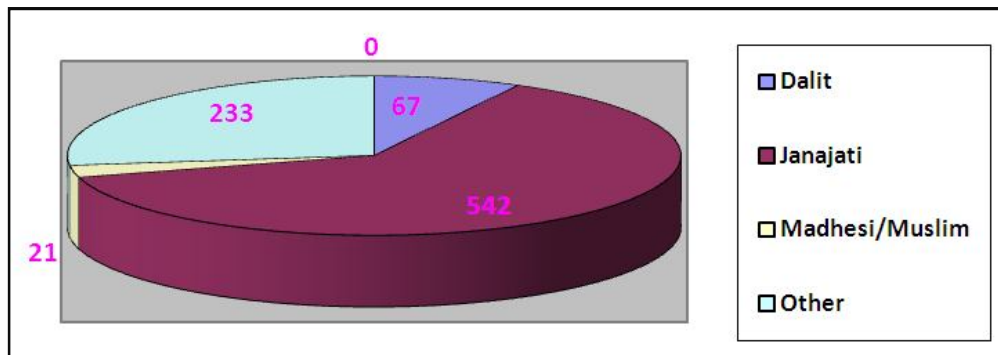
Location of Squatter Settlements	Number of Settlements	Total Population	Male	Female	Total Households	Average Household Size
Bagmati	11	3903	2052	1851	863	4.5
Bishnumati	5	1564	768	796	306	5.1
Hanumante	1	2422	1290	1132	589	4.1
Dhobikhola	5	1247	653	594	271	4.6
Tukucha	2	843	459	384	176	4.8
Other Locations	16	2747	1390	1357	530	5.2
Total	40	12726	6612	6114	2735	4.7

Source: Lumanti Bulletin, 2069 B.S.

The 11 squatter settlements along the Bagmati River have 863 households which is 32% of the total squatter households in Kathmandu Valley. Above table shows most of the squatter settlements established near rivers. There are nearly 10000 people living in 2205 households in squatter settlements along river banks of the valley. Thus a huge number of squatters are residing nearby river.

3.1 Squatter Settlements along Bagmati Riversides

The 11 squatter settlements along the Bagmati riversides are residing. Following figure shows the ethnicity of squatter residents along Bagmati riversides.

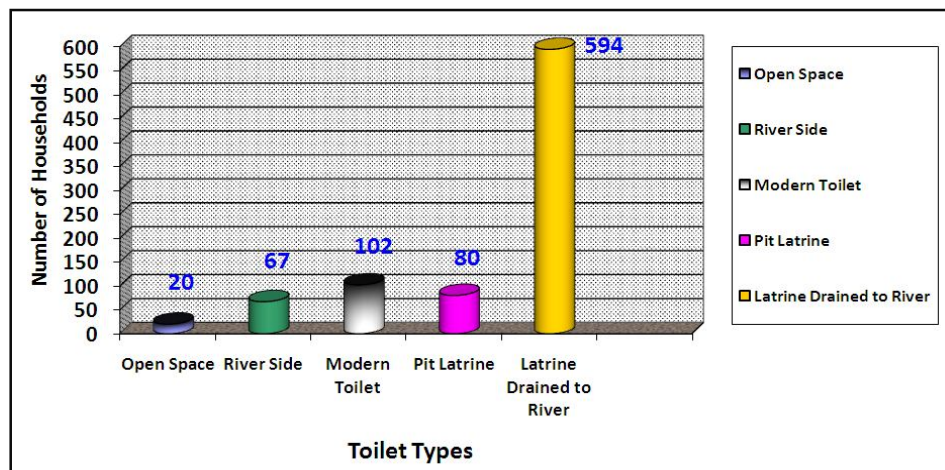
Figure: 4 Ethnicity of Squatter Residents along Bagmati River

Source: www.google.com/kathmandu/squatter-settlements: accessed in September, 2012.

Above figure shows, the other category of ethnicity consists of mainly Brahmin, Chhetri, Giri, Puri and Thakali. The Janajati consists of more than 50 castes such as Sherpa, Tamang, Magar, Gurung, Newar, Rai, Lama, Limbu etc. Dalit includes Pariyar, Deula and Kami. Madhesi includes Yadab, Thakur, Mahato, Jha etc. and Muslim includes Miya, Chureta, Khan etc.

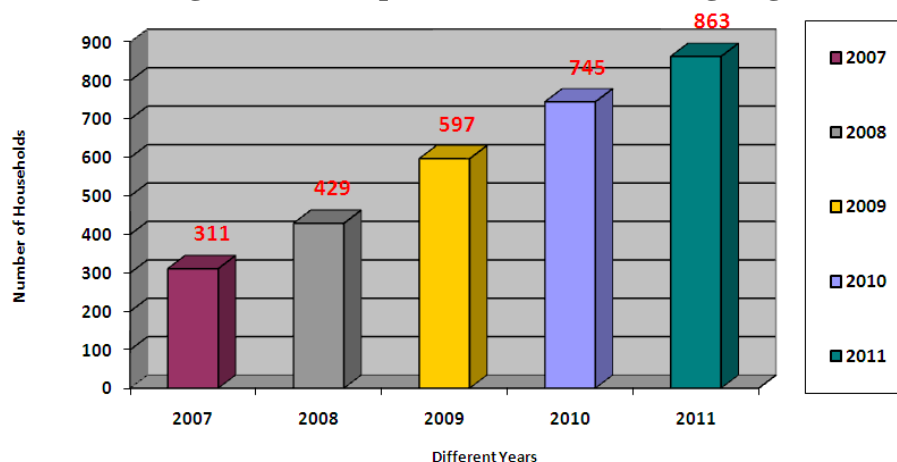
Figure 5 shows that out of total 863 households 20 households use the open space for toilet, 67 households use riverside, 102, 80 and 594 households use modern toilet, pit latrine and latrine drained to the river respectively. It shows that only 182 households out of 863 use the safe toilet and do not pollute the river and surrounding environment. This situation further indicates that one of the major pollutants of surrounding environment are the squatter settlements of Bagmati riversides.

Figure: 5 Use of Toilet by Squatter Settlements along Bagmati River



Source: Lumanti Bulletin, 2069 B.S.

Figure: 6 Increasing Trends of Squatter Households along Bagmati Riversides



Source: www.google.com/kathmandu/squatter-settlements/in-different-years:accessed in September, 2012

Figure 6 shows that the increasing trends of squatter households along Bagmati riversides, the data have been taken from 2007 to 2011. Within total 5 years the numbers of squatter households increased 311 to 863. The growth rate is 37.94 percent in 2008, 39.16 percent in 2009, 24.79 percent in 2010 and 15.83 percent in 2011. This further indicates rapid growth in the years 2008 and 2009 and slower growth in 2010 and slow in 2011. Now the government has felt squatter settlements as serious problem for the improvement of Bagmati River and its environment. The government initiated in May 2012 to shift squatter settlements from there to other places but organized protest against government and support of some political parties this process stopped suddenly and reestablished the squatter settlements on the bank.

A Case Study

Box: 1 Durga Kami and her Situation

21 years old girl named Durga Kami came from Dhading to Kathmandu in 2005, she had no parents but stepmother and a brother. She had left school after primary education due to workload at home. In Kathmandu she joined in a working team of building construction. Within 6 months of working period with this team married with a boy of Sindhupalchowk District, who was also a member of this team. One day while they were working, listened a rumor that on the bank of Bagmati River new settlements were being constructed by homeless workers. Next day they went Bagmati River bank 'Sankhamul' to know the fact; they visited few people who were constructed bamboo cottages, among them few were known of their area, they invited them to make such cottage recently, and then they booked the place for cottage. Next day, they started to make cottage for shelter, now they have 5 children, have passed 7 years on the bank of river and the couple works building construction works. They don't have toilet, drinking water, children are out of school and the subsistence of life is very difficult. Kathmandu Metropolitan City Office forces them to leave the place time and again 'once a month in average' but till this year they are there.

Source: Field Survey, September, 2012.

4. Bagmati River and its Environment

Bagmati corridor is most probably the only open space left in the city core areas of Kathmandu valley, although the environmental condition is very poor. The unmanaged sewage connections, solid waste dumping and development uncontrolled squatter settlements along the river banks have deteriorated the environmental conditions and hence has affected not only the aesthetic value but also the economic opportunity of the land alongside the river corridor. The open space and the river which could have been at asset to the urban areas of the city has been left neglected and polluted. The Bagmati corridor contains several important elements of historic and cultural importance which the study identifies as at risk. Encroachment of land by the squatter

settlements is on the rise. There is predominant encroachment of land adjacent to the river, by the people due the vague demarcation of river boundary and water way width. Hence the entire river corridor is in a chaotic state. However with proper planning and efficient implementation strategies this chaotic scenario can be changed. There are a lot of opportunities amidst the prevalent threats and a lot of strengths amidst the weaknesses which needs to be analyzed. Realizing the opportunities and the strengths the development plan for the entire Bagmati corridor has been proposed which is only conceptual. The present river environment deterioration at the rapid rate immediately highlights the necessity of the buffer zone. The concept of buffer zone is not new, but has been developed since long time back. However, till now the concept has been failed to be practiced.

5. Squatter Settlements and Environment

The river bank and land left by the river in due course of diversion has been confiscated by squatters. Both permanent and temporary squatter settlements can be seen along the river corridor. Besides the severe encroachment of land, much more environmental impact could be observed due to their settlement to the river. The manual improvised sand mining and direct discharge of their toilet to the river can be seen. Thus, their removal from the corridor is important not only because of the land value but also from river health point of view. Usually, a squatter settlement is highly organized despite being illegal. The occupants have clearly defined behavioral rules, spatial boundaries and methods of solving tenurial disagreements. Illegal housing is sold, land is subdivided and leased, and other transactions are possible as if the land or housing was legal. The settlement is also typically recognized by the public or private landowner, and, if the landowner is private, rents are often transferred. Squatter settlements have gradually become an integral part of the urban fabric.

The proximity to income-earning opportunities in the city centre is normally a crucial issue for the urban poor and, to gain access to inexpensive centrally-located land for housing, the urban poor normally have to sacrifice tenure security. They are forced to encroach on any type of vacant land illegally (often ill-suited for housing) and to ignore building and development regulations. Many housing programs implemented by governments have failed because they have been located in the urban fringe where income-earning opportunities normally are scarce.

Eviction has three basic impacts on those affected: physical, economic and psychological. Eviction reduces the housing stock of the city and ruins the economic value of the housing which may be small in real terms but big for the individual. It detaches the squatter from employment opportunities which are usually nearby or even in the settlement itself. It also uproots them from the community which functions as an economic and psychological safety net. The home is the centre of everybody's lives and eviction, often forceful, is a very traumatic experience, especially for the children. While the eviction is a traumatic experience in itself, the most harmful impact of eviction may actually be the fear of being evicted. The fear makes people fatalistic, loses confidence in them and discourages them from improving their housing.

It cannot be denied that there are occasions such as major infrastructure projects where eviction cannot be avoided and to generally deny landowners the right to evict would be to, in actual fact, acquire land compulsorily without compensation. Governments will be most efficient if they act as facilitators. The problem of shelter provision is actually more political and institutional rather than technical. Most observers of squatter settlements have realized that people will gradually upgrade their housing over time if they are provided the opportunity. They will invest capital and labour as well as mobilize their social network. However, these gradual improvements will only take place if their housing is considered legitimate. Provision of land is a key issue to alleviate the shortfall of housing for the urban poor. In most cities there are considerable land areas which are suited for housing but not used intensively. The challenge would be to find and implement effective strategies for helping the urban poor. There are already several solutions to the problem of access to land, ranging from provision of the most basic element, tenure security (normally the major component of slum upgrading programs) to sophisticated sites-and-services programs and land readjustment schemes. The urban poor are capable of improving their housing conditions by themselves if they are provided some type of security, or at least perceived security, of tenure. In actual fact, governments wishing to remedy the housing conditions of the urban poor are left with only two major - more or less costly - options to provide more land: (1) legalizing the tenure of illegal settlers where they are and allowing them to pay below market prices for the land; and (2) allocating public land to low-income households at subsidized rates. The governments would have to provide land which is reasonably close to income opportunities and basic amenities in order to make it a real alternative to squatting.

In case of Bagmati, relocation of the squatter settlements seems to be a viable option. During the evacuation of Bishnumati River corridor, the prevailing squatter settlement was relocated to Kirtipur, for which land was subsidized by the assistance of urban community support fund created by Lumanti and Kathmandu Metropolitan City. This relocation is a successful model that can be replicated in relocation of the squatter settlement in Bagmati River. Following may be the good strategy for removal of the squatter settlement.

- The squatter settlement can be relocated at government land away from the river in the area where land cost is less.
- Provide subsidy to get land for their settlement nearby currently settled location.
- The land available at the river corridor can be used to build apartment (flat system) with initial investment by the government. The relocated squatter will have to pay for land as well as for the house in installment (Source: www.google.com/kathmandu/bagmati-squatter-settlements-and-environment).

6. Attempts to Conserve the Environment of Bagmati River

For the last ten years, one such effort in generating awareness about the Bagmati's plight "Bagmati River Festival", the festival of 21st century has been put forward by the Nepal River Conservation Trust (NRCT). NRCT is a non-profit organization that was established by a group of concerned river guides and environmental professional

who were alarmed by the ecological, social as well as cultural damage that was wreaking havoc on Nepal's river. The Bagmati river festival was started in 2001 to provide a platform for all interested individuals and organizations to express their concerns and provide solutions to overcome the plight of this holy river.

6.1 Bagmati River Festival

In response to the worsening situation of the Bagmati River and in order to alter the biological degradation in it, NRCT had initiated Bagmati river conservation campaign called Bagmati River Festival (BRF) in 2001, in association with some likeminded organizations. The festival aimed to provide a platform for all interested individuals and organizations to express their concern and provide solutions to overcome the plight of this holy river. Since then, BRF is being organized on an annual basis and today, the number of active partner organizations has crossed over hundreds. Also, over four-hundred institutions have participated in this event so far, since its inception in 2001. The partner organizations includes many I/NGOs, I/GOs, academia, research and development organizations, business houses, local clubs, media, actors, singers and music bands, conservation campaigners and civil society. Government organizations like Nepal Tourism Board, Sustainable Tourism Network, Kathmandu Metropolitan City, different Ministries and some I/NGOs along with donor communities, corporate and media houses etc. are providing minimum funding and technical support to organize, the events included in the BRF. The festival has attracted people of all age, groups (School children to university graduates and job holders to retired professionals) and from a variety of professions. The two and half month festival is formally launched every year on June 5th to mark the World Environment Day (WED) and continues till the third or fourth week of August depending on Nepali calendar, it ends on Nagpuja, a holy festival of Hindus.

For the conservation of Bagmati Environment many organized and unorganized attempts through local NGOs, CBOs and Youth Clubs are made but the major attempt from the side of government was made by forming Bagmati Environment Improvement Plan. The features of this plan are mentioned below:

6.2 Bagmati Environment Improvement Plan

This plan developed by *Adhikar Sampanna Bagmati Sabhyata Akirit Samitee*, in May 2008 for the conservation of Bagmati environment. But unfortunately this plan has not been implemented yet.

The main features of the development plan are as follows:

- Development of green belt all along the corridor, on either side, so as to promote a healthy and green environment.
- Recharge and maintain the natural flow of river and promote management practices that will help to stabilize the volume of water carried by the river and to safeguarding water quality.
- Promote the natural ecosystem of the river and its territory by giving due emphasis to the growth of biodiversity in the river and along the corridor in terms of fish, plants, birds etc and improving fishery productivity by encouragement of habitat for indigenous species

- Develop a riverside road, (which already exists in most of the riversides) so as to ease the traffic congestion in the valley.
- Manage public access to riverbanks enhance the livelihood of the area by developing cycling and pedestrian jogging tracks along the corridor
- Conserve and regenerate the cultural elements like Ghats Pattis, temples etc.
- Create interesting landscape along the corridor so as use the vacant land and to promote a pleasing aesthetic environment along the corridor
- Improve understanding of the river environment amongst land managers, local people, agencies and visitors in order to promote interest in its management.

7. Squatter Settlements and Impacts on Environment

Human settlement and various physical works along the river corridor not only alter the practice of land use but also spoil the river environment. The deterioration of the River environment has several unpleasant consequences the important one being the health issues of the inhabitants. The sanitation system of Katmandu Valley and other aspects have played a major role in degrading the river environment.

The establishment of the squatter community along the river is one of the major contributors of the river deterioration. These settlements include the community thriving below the poverty line, and thus are capable of directly exploiting the river environment to their benefit as well as the most vulnerable lot to the river disasters like water borne diseases, flooding, etc. Shanti Nagar, Bijay Nagar, Jagrit Nagar, Gaigaun, Chandani Tole, Pragati Tole, Kalimati Dole, Kimal Phant, Bansighat, Kuriyagaun, and Sankhamul are some of the squatter settlements along the Bagmati River. Both permanent and temporary squatter settlements are present at river banks. Besides the severe encroachment, much more impact could be observed due to their settlement to the river. The sand mining was observed here. Their toilet discharge directly to the river or toilets are constructed above the river.

7.1 Solid Waste

Solid waste dumping along the banks of the river by squatter settlements is one of the major causes of river environment degradation. Throughout the stretch solid waste disposal is observed. At some places the disposal is intense and some very scattered. Plastic are the fast eye catchers among those dumped heap as well as in the scattered wastes. Solid waste disposal is not limited to the banks but into the river and the piers of the bridge as well. The disposal has resulted in breaking flow of river and diversion to some extent. Remnants of animals and Slaughter house wastes are another big problem. Construction debris thrown haphazardly along the corridor is also another source of pollution. The river banks are also used by the municipalities to dump the solid waste in some parts.

7.2 Water Pollution

Sewage disposal by squatter settlements without any treatment along Bagmati Corridor is one of the major sources of water pollution turning the river virtually into an open drain. Including the disposal of untreated sewage from the municipal sewers,

other illegal sewerage disposal points on both sides of the river banks are observed. Trunk sewers have also been discharging the sewage directly open into the river at various points. Besides that, human fecal wastes are observed along the whole stretch comparatively high towards the downstream and mostly at the bridges areas. Many public toilets have been constructed near by the river and the waste is directly discharged into the river stretch. Toilets are very common at the squatter areas and the waste water is being directly discharged into the river.

Utilization of Ground water source (hand pump and shallow boring) is intensive in squatter areas for household use as well as for industrial use. Spring water sources were seen along the river near by the banks. During the field visit those sources were noticed to be utilized for onsite washing, cleaning dishes as well as for consumption.

7.3 Air Pollution

Air pollution by the squatter settlements has been observed through solid waste burning practice, decomposition of dumped solid waste and sewage at the site of Bagmati River.

7.4 Land Pollution

Land pollution by the squatter settlements has been observed through dumping solid wastes such as plastics, sands, stone, human-stool etc. on the open or agriculture land around their settlements.

7.5 Sand Mining

Illegal sand mining on Bagmati River by the squatter community people has created several environmental problems. The flowing space has been extended on the far sides of the river. Open and vegetation area on either sides of river has been converted as the flowing ground of the river. Haphazard piles of sand on the side of river may blow by the air and air is also polluted through this.

8. Squatter Settlements and Impact on Economy

Squatter settlements generate public costs of many kinds, many of them a result of negative environmental impacts. Particularly, it compares the cost of providing urban services to them. Squatter settlements upgrading projects may have of huge amount especially to manage public site for housing, land to agriculture or employment, sanitation, drinking water, electricity, health, education, toilets, and other infrastructures. The inclusion of environmental impacts is chiefly responsible for raising the total cost of squatter settlement management schemes. Government, typically, bears the bulk of the extra costs of rationalizing road networks, extending infrastructures, picking up garbage and management of deteriorated overall environment. But the level of government depends on the strength of economy.

Poor residents of these communities bear much of the immediate negative environmental and health impacts morbidity and mortality rates closely linked to environmental quality, namely infant mortality, diarrhea and respiratory diseases. This may multiply over the nearby other settlement areas and as a whole city may be at risk.

Public health authorities in Kathmandu note that only a miracle has saved the area from major epidemics especially in dry season. In this season squatter settlements mostly use dirty water for the drinking and other purposes.

In Nepal, government has tried to correct the high cost and poor targeting of the traditional approach through upgrading squatter settlements. These upgrading efforts, typically, are one-time investments in infrastructure, for example through rationalizing and paving a road network, by providing water and sanitation systems, etc. and this after land invasions have determined the location and pattern of land development. The lobby for upgrading is often weaker than that for new development. Some politicians promote it because votes can be won by allowing squatter invasions and by further providing infrastructure periodically as the need for support arises, mainly at election time. Housing NGOs and housing experts also often advocate upgrading for a variety of reasons. However, as the Bagmati River bank experience indicates unguided squatter upgrading results in high per unit costs and low cost recovery for modest results. In addition, it provides no additional solutions that relieve the pressure for land invasions.

9. Results

The steadily increasing population and related solid waste dumping in the river has made the Bagmati River and its tributaries excessively polluted. The river's capacity to purify itself by means of interaction between biotic and abiotic characteristics of the river tends to zero. Bagmati Corridor has been utilized and encroached at various places for a variety of reasons. This aspect requires emphasis as the river corridor is the most vulnerable environment which comes under the popular problem of "Crisis of the Common" since it is common as a public property. The area is most vulnerable to the over exploitation. Inhabitants can easily encroach upon the corridor if proper monitoring is not undertaken. The squatter environment is the perfect breeding ground for a wide range of social and environmental problems. High unemployment often causes men to stay around the home growing increasingly frustrated with their pathetic situations and the worsening poverty.

Some of the corridor segments run along the pro-urban areas where source of economy is agriculture and to a very small extent in urban areas were used for the temporary cultivation plots. At squatter areas land use for agricultural purpose was seen intensively. The physical infrastructure such as roads and public toilets, were also seen to be encroaching the river territory.

Increasing trend in the number of the squatter settlements is one of the key issues related to uncontrolled urban growth in Kathmandu Valley. Out of 40 settlements 11 settlements are situated along the Bagmati riverside, where 3903 people (2052 male and 1851 female) are residing. The increasing trend of squatter households on this side has found 37.94 percent in 2008, 39.16 percent in 2009, 24.79 percent in 2010 and 15.83 percent in 2011. This indicates rapid growth in the years 2008 and 2009 and slower growth in 2010 and slow in 2011. These settlements are very vulnerable to highly polluted environment and flood risks. In the dry season especially on January, February, March, April and May they are to be suffered from very bad smell of stool

and other mixtures of the river. In this season they are also compelled to drink very dirty water of the riverside. The attempt of the government and other agencies to manage squatter settlements and conservation of Bagmati environment seems inadequate in terms of coordination and regulation of it for the longer time. Squatter settlements have seen major causes of river environment pollution through dumping of solid waste, toilet drained to river, sand mining and encroachment of public property. Squatter settlements are posing extra cost to the government and other agencies to manage their settlements and riverside environment. The historical importance of Bagmati River is also decaying day by day because of the encroachment of river territory and pollution over the river water.

10. Discussion of Results

- Squatter settlements along the Bagmati River are living on very vulnerable polluted environment and flood risks, most of them are using open sky toilets or direct drained to the river.
- The growth of squatter settlements on this riverside seems rapid in the years 2008 and 2009 but slower in 2010 and 2011 it may be because of political changes in Nepal. Lack of riversides monitoring mechanism of The Government of Nepal is responsible for the growth rate of them.
- The squatter settlements of Bagmati riverside seems major pollutants to the river environment through solid waste dumping, toilet direct drained to river, plastics and sand extraction around their areas.
- Poverty alleviation strategy and present trend of housing development have failed to address the needs of housing for urban poor living in slums and squatter settlements of the Bagmati River banks.
- Squatter settlements of Bagmati riversides are posing the extra cost of the government to manage their settlements and improvement of the riverside environment. Shifting process of the government failed because of strong protest of them and support of some political parties to them.

11. Conclusion

Riverbank seems to be the area that highly attracts the squatter communities. People residing in squatter settlements face many problems like improper sanitation, unhygienic environmental conditions, social, economic, health, educational and cultural problems and many more. The basic problems inherent in slums are health hazards, lack of basic amenities like safe drinking water, proper housing, drainage and excreta disposal services, make slum population vulnerable to infections. The squatter environment is the perfect breeding ground for a wide range of social and environmental problems. High unemployment often causes men to stay around the

home growing increasingly frustrated with their pathetic situations and the worsening poverty. For decades the issue related to the poor families living in the slums and squatter settlements have not been addressed well. The Government of Nepal has no proper plan with full of commitments to shift them from there to other places for the improvement of their situation and environment. Only the programs and policies of short period of time have brought limited results to improve the situation. This study gives enough background information on the need of improving squatter settlements making proper arrangement of alternatives with respect to helping people live a decent life as well as contributing to conserve the environment of Holy River.

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